

YELLOWSTONE RESOURCES & ISSUES

2001

*Division of
Interpretation*

•

*Yellowstone
National Park*

Produced in Yellowstone National Park, WY

All material is in the public domain unless noted below.

All photographs (including cover) from NPS collections, except:

p. 28, Renee Evanoff; 47, 53, 57, Tom Cawley; 80 (both), Jennifer Whipple; 85, 92 (moose), 106 (both), 141 (Clepsydra, Great Fountain), Carolyn Duckworth; 102, Bob Lindstrom; 103, Thomas Brock; 128, UWS/UWM Great Lakes Water Institute; 129, 141 (Artemesia, Grand Prismatic), 143, Frank Smith; 135, Paul Doss

All illustrations produced by NPS. Map on p. 15 adapted from U.S. Geological Survey, www.usgs.gov. The map and chart on page 71 first appeared in *Yellowstone Science*, Volume 7, Issue 1 (Winter 1999).

CONTENTS

2001

Introduction	1	3 Natural Resources	27
The Beginning of an Idea	1	3:1 Greater Yellowstone Ecosystem ..	27
Park Facts	3	3:2 Mammals	31
Frequently Asked Questions	4	List of Mammals in YNP	31
1 History	9	Small Mammals	33
The Earliest Human Visitors	9	Bear, Black	39
European Americans Arrive	10	Bear, Grizzly	41
Expeditions	11	Bear, Management History	43
Birth of a National Park	12	Beaver	45
The Formative Years	12	Bighorn Sheep	46
The Army Arrives	13	Bison	47
The National Park Service Begins ..	13	Cats: Bobcat & Lynx	49
Touring the Park	14	Cougar	50
The Legacy of Yellowstone	15	Coyote	51
2 Geology	17	Deer, Mule & White-tailed	52
Plate Tectonics	17	Elk	53
Volcanoes	18	Fox	55
The Hydrothermal System	19	Moose	56
Color in Thermal Areas	20	Pronghorn	59
Earthquakes & Glaciers	21	Wolf	61
Sedimentation & Fossils	22	3:3 Birds	63
Yellowstone As Laboratory	23	3:4 Fisheries & Aquatic Resources ..	67
Geoccosystem	24	3:5 Reptiles & Amphibians	71
		3:6 Vegetation	77
		Major Types	77
		Trees	78
		Endemics	80
		Non-natives	81
		4 Fire In Yellowstone	85
		Fire Ecology	85
		Fire Management	86
		The Fires of 1988	88
		Results of Research	91
		Contents continue	

5	Cultural Resources	95
	Archeological Resources	95
	Piecing Puzzles Together	96
	Native Americans	96
	Ethnography	97
	European American Sites	97
	Historic Structures	97
	Cultural Landscapes	98
	Museum Collections	98
	Library & Archives	99
	Cultural Themes	99
	Historic Resources	100
6	Controversial Park Issues	101
	Bioprospecting	101
	Bison Management	104
	Fisheries: Lake Trout	108
	Fisheries: Whirling Disease	110
	Grizzly Recovery Plan	111
	Grizzly Conservation Strategy	113
	Northern Range	115
	Winter Use	117
	Wolf Restoration	121
7	Major Areas of the Park	125
	Canyon	125
	Lake & Fishing Bridge	127
	Mammoth Hot Springs	131
	Norris & Madison	135
	Old Faithful	139
	Tower–Roosevelt	143
	West Thumb & Grant	147

PREFACE

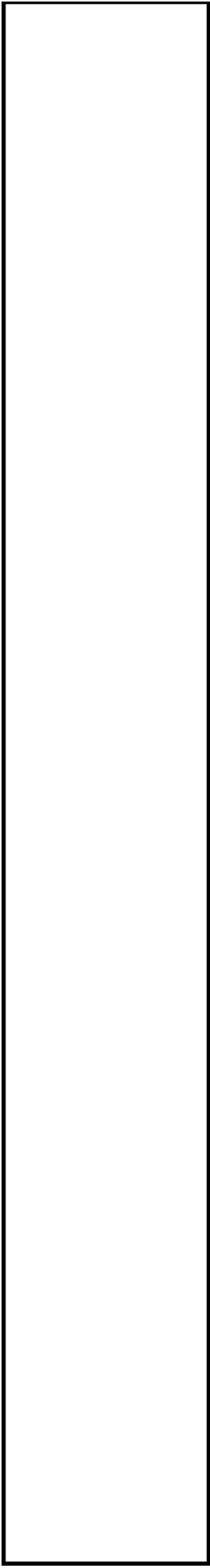
2001

In this book, you will find information about the park's history, natural resources, cultural resources, issues, and major areas. This material was provided and reviewed by park reserachers, resource specialists, and planning staff.

The book is organized to present key facts at the beginning of each section, then an overview of the subject, and finally resources you can consult for more details. Some material is repeated in different sections of the book to accommodate people who will not be reading the entire book.

Information about Yellowstone constantly changes; the information provided here is current as of March 2001. You can find some updates on the park website (www.nps.gov), through park publications, or by asking the park's interpretive rangers who staff the visitor centers.

We welcome your feedback and comments.



INTRODUCTION

The Beginning of an Idea

One of the most enduring legends of Yellowstone National Park involves its beginning. In the mid 1800s, explorers gathered around a campfire at the junction of two pristine rivers, overshadowed by the towering cliffs of the Madison Plateau. They discussed what they had seen during their exploration, and realized that this land of fire and ice and wild animals needed to be preserved. Thus, the legend goes, the idea of Yellowstone National Park was born.

graphic removed for
faster downloading

It's a wonderful story—and a myth. But those men were real (see Chapter 1), and so was this land that they explored. Thanks to their reports and the work of explorers and artists to follow, the United States Congress established Yellowstone National Park in 1872. The Yellowstone National Park Act says, in part, that “the headwaters of the Yellowstone River . . . is hereby reserved and withdrawn from settlement, occupancy, or sale . . . and dedicated and set apart as a public park or pleasuring-ground for the benefit and enjoyment of the people.” In an era of expansion throughout the young nation, the federal government had the foresight to set aside land deemed too valuable to develop.

For the following 18 years, Yellowstone was “the national park.” Then in 1890 Congress established three more national parks: Sequoia, General Grant (now part of Kings Canyon), and Yosemite. Mount Rainier followed in 1899. In 1906, Congress passed the Antiquities Act, which gave the president authority to establish national monuments. By 1914, the United States had 30 national parks and monuments, each managed separately and administered by three different federal departments—Interior, Agriculture, and War. No unified policy or plan provided for the protection, administration, and development of these parks and monuments.

The management of Yellowstone from 1872 through the early 1900s, which is described in Chapter 1, helped set the stage for the

creation of an agency whose sole purpose was to manage the national parks. Promoters of this idea gathered support from influential journalists, railroads likely to profit from increased park tourism, and members of Congress. The National Park Service Act was authorized by Congress and approved by President Woodrow Wilson on August 25, 1916:

There is created in the Department of the Interior a service to be called the National Park Service, [which] . . . shall promote and regulate the use of the Federal areas known as national parks, monuments, and reservations . . . by such means and measures as conform to the fundamental purpose to conserve the scenery and the natural and historic objects and the wild life therein and to provide for the enjoyment of the same in such manner and by such means as will leave them unimpaired for the enjoyment of future generations.

The National Park System

Today, the National Park Service (NPS) manages approximately 83 million acres in 49 states, the Virgin Islands, Puerto Rico, Guam, and American Samoa. Delaware is the only state without an NPS unit.

National parks are the oldest, most well known part of the system and are usually areas of spectacular natural scenery relatively untouched by human development.

TWO “ORGANIC ACTS”

The laws creating Yellowstone National Park and the National Park Service are both often called “The Organic Act.” This is not an official short title for either law, but it is more widely used for the law that created the National Park Service. Therefore, in this book, we will refer to the laws as The Yellowstone National Park Act of 1872 and The National Park Service Act of 1916.

Intro

Units in the National Park System

Total, as of March 2001:
384

- 1 International historic site
- 3 Natl.battlefield parks
- 1 Natl.battlefield site
- 11 Natl.battlefields
- 40 Natl.historical parks
- 77 Natl. historic sites
- 4 Natl.lakeshores
- 28 Natl.memorials
- 9 Natl.military parks
- 73 Natl.monuments
- 57 Natl.parks
- 4 Natl.parkways
- 17 Natl.preserves
- 18 Natl.recreation areas
- 2 Natl.reserves
- 6 Natl.rivers
- 3 Natl. scenic trails
- 10 Natl.seashores
- 9 Natl. wild and scenic rivers and riverways
- 11 Sites without designation

National parks are established by acts of Congress. National monuments are areas of historic or scientific interest that are established by presidential proclamation. National historical parks and national historic sites are both set aside to commemorate some facet of the history of the people of those areas. Many national memorials fit this description, but some of these are also set aside because of important historical issues not specifically linked to the site of the memorial, such as Mt. Rushmore NM and Vietnam Veterans NM. Most other types of National Park System units are well defined by their titles.

Principal Objectives of the National Park Service

The National Park Service has the dual responsibility of preserving parks in their natural state (or, at historical areas, to preserve a scene as nearly as it appeared on a certain date), and, at the same time, making these areas accessible for public use and enjoyment. These two principal objectives are often incompatible and difficult choices must be made; two basic policies provide some direction:

- Natural resources (plants, animals, water, air, soils, topographic features, paleontologic resources, and esthetic values such as scenic vistas, natural quiet, and clear night skies) are managed to maintain, rehabilitate, and perpetuate their inherent integrity. Native species that have been exterminated should be reintroduced and exotic species eliminated, if possible. Livestock grazing, hunting, and resource extraction are prohibited in National Park System areas, although a few rare exceptions occur.
- Cultural resources (prehistoric and historic structures and resources, landscapes, archeologic resources, ethnographic resources, and museum collections) are preserved.

To implement these policies, each park prepares a General Management Plan/Master Plan that outlines management zones. In Yellowstone:

- Natural zones (most of Yellowstone National Park) protect natural resources and values. All components and processes of park ecosystems, including the natural abundance, diversity, and ecological

integrity of the plants and animals, should be maintained. Change is recognized as an integral part of functioning natural systems, and interference is allowed only under special circumstances such as emergencies when human life and property are at stake.

- Cultural or historic zones, such as Fort Yellowstone, preserve cultural resources. Where compatible with cultural resource objectives, the policies for natural zones will be followed. Any action that will adversely affect cultural resources will be undertaken only if there is no reasonable alternative, and all reasonable measures to limit adverse effects will be taken, including recovery of data and salvage of materials.
- Development zones, such as around Old Faithful, allow for intense visitor use. Roads, walks, buildings, and other visitor and management facilities may occupy much of the zone and the natural aspect of the land may be altered. However, if a park manager determines that a resource is or would become impaired by public use or development, the manager may limit public use or close a specific area.

As the first national park, Yellowstone continues to be a leader in developing and implementing policies in the National Park Service.

Park Facts

FLORA

8 species of conifers
Approximately 80% of forest is comprised of lodgepole pine
More than 1,700 species of native vascular plants
More than 190 species of exotic (non-native) plants
186 species of lichens

ROADS AND TRAILS

5 park entrances
466 miles of roads (310 paved/primary miles)
950 miles of backcountry trails
97 trailheads
287 backcountry campsites

FACILITIES

9 visitor centers and museums
9 hotels/lodges (2,238 hotel rooms/cabins)
7 NPS-operated campgrounds (454 sites)
5 concession-operated campgrounds (1,747 sites)
2,000+ buildings (NPS and concessions)
49 picnic areas
1 marina

EMPLOYEES

During the summer:
Approximately 800 people work for the National Park Service (about 380 year-round)
Approximately 3,700 people work for concessioners

CULTURAL RESOURCES

1,000+ documented archeological sites
6 National Historic Landmarks (Obsidian Cliff and 5 buildings)
More than 200,000 museum objects
20,000 bound publications in research library
2,500 linear feet of historic documents
About 90,000 photographic prints and negatives
More than 20 affiliated Native American tribes

WILDLIFE

7 species of native ungulates
2 species of bears
Approximately 50 species of other mammals
311 recorded species of birds (148 nesting species)
18 species of fish (6 non-native)
6 species of reptiles
4 species of amphibians
3 threatened species: bald eagle, grizzly bear, lynx
2 endangered species: whooping crane, gray wolf (designated an experimental and non-essential population in YNP)

GEOLOGY

An active volcano
Approximately 2,000 earthquakes annually
More than 10,000 thermal features
More than 300 geysers
One of the world's largest calderas, measuring 45 x 30 miles
One of the world's largest petrified forests
Approximately 290 waterfalls, 15 ft. or higher, flowing year-round
Tallest waterfall: Lower Falls of the Yellowstone River at 308 ft.

YELLOWSTONE LAKE

136 square miles of surface area
110 miles of shoreline
20 miles north to south
14 miles east to west
Average depth: 140 feet
Maximum depth: About 400 feet

VISITATION

2000: 2,838,233 entries to the park
Record year: 1992—3,144,405 entries
Winter visitors: more than 140,000

GENERAL

World's first national park
A designated World Heritage Site and Biosphere Reserve
3,472 square miles or 8,987 square km
2,221,766 acres or 899,139 hectares
63 air miles north to south (102 km)
54 air miles east to west (87 km)
96% in Wyoming, 3% in Montana, 1% in Idaho
Highest Point: 11,358 ft. (Eagle Peak)
Lowest Point: 5,282 ft. (Reese Creek)
Larger than the states of Rhode Island and Delaware combined
Approximately 5% of park is covered by water; 15% is grassland; and 80% is forested
Precipitation ranges from 10 inches (26 cm) at the north boundary to 80 inches (205 cm) in the southwest corner
Temperatures (average) range from 9°F in January to 80°F in July at Mammoth Hot Springs
Record High Temp: 98°F (Lamar 1936)
Record Low Temp: -66°F (Madison 1933)

Intro

Frequently Asked Questions

Why is Yellowstone National Park significant?

- World's first national park
- International symbol of natural preservation
- A Biosphere Reserve and a World Heritage Site (see page 10)
- Half of the world's thermal features—more than 10,000, including the world's largest concentration of geysers—more than 300
- Home of the world's tallest active geyser, Steamboat, which erupts to more than 300 feet
- One of the few places in the world with active travertine terraces
- Thermal features contain microbes that are providing links to primal life, origins of life, and exobiology; plus they are proving useful in solving some of our most perplexing medical and environmental problems (see Chapters 2 & 6)
- With the restoration of the gray wolf in 1995, now contains all the large mammal species known to be present when European Americans first arrived
- Protects two federally listed endangered species, the gray wolf (designated experimental and non-essential in YNP) and the whooping crane, and three threatened species, the grizzly bear, the bald eagle, and the lynx
- Home to the largest concentration of elk in the world
- Only place in the U.S. where bison have existed in the wild since primitive times. The early legislation that protected these bison, the Lacey Act, is one of the precursors to the Endangered Species Act
- Core of the Greater Yellowstone Ecosystem—one of the largest intact temperate zone ecosystems remaining on the planet (see Chapter 3)
- Site of one of the largest volcanic eruptions in the world, which left behind one of the largest calderas
- Contains world's largest petrified forest
- Site of the spectacular Grand Canyon of the Yellowstone
- Location of largest lake above 7,000 feet in North America—Yellowstone Lake
- Source of many great North American rivers: two of the three forks of the Missouri; headwaters of the Snake, which flows into the Columbia and eventually into the Pacific. The Yellowstone River, which begins just south of the park, is the longest free-flowing river in the U.S.
- Yellowstone is also a refuge for the human soul. People have come here to recreate and to rest for centuries

How did Yellowstone get its name?

The name does not come from the brightly colored, thermally altered rhyolite in the Grand Canyon of the Yellowstone. Its origin goes back to when French-Canadian trappers encountered the Minnetaree tribe along a river in what is today eastern Montana. When asked about the name of that river, the Minnetaree responded “Mi tse a-da-zi,” which translates as “Rock Yellow River.” The trappers translated this into French—“Roche Jaune” or “Pierre Jaune.” In 1797, explorer-geographer David Thomson translated the name into English—“Yellow Stone.” Lewis and Clark referred to the Yellowstone River by the French and English forms. Subsequent usage formalized the name as “Yellowstone.”

How big is Yellowstone?

Yellowstone National Park is 3,472 square miles (2,221,766 acres) in size. It is larger than the states of Rhode Island and Delaware combined. Ninety-six percent of the park lies in Wyoming, 3 percent in Montana, and 1 percent in Idaho.

Weren't there other national parks before Yellowstone?

Some sources list Hot Springs in Arkansas as the first national park because it was set aside in 1832, forty years before Yellowstone was established. Hot Springs is the nation's oldest national reservation, but the purpose for its creation was different from that of Yellowstone. The intent at Hot Springs was to ensure preservation and equitable distribution of a utilitarian resource, much like our present national forests. In 1921, an act of Congress established Hot Springs as a national park.

Others will argue that Yosemite preceded Yellowstone as the first national park. In 1864, Congress set aside the area surrounding the Yosemite Valley and the Mariposa Grove of Big Trees and gave them to the state of California to administer for the purpose of public use and recreation. In 1890, Congress established Yosemite as a national park 18 years after it established Yellowstone National Park.

Where are the bears?

People who visited Yellowstone prior to the 1970s often fondly remember seeing bears along roadsides and within developed areas of the park. Although observing these habituated bears was very popular with park visitors, it was neither good for the people or the bears. (See Chapter 3.) In 1970, the park initiated an intensive bear management program to return the grizzly and black bears to feeding on natural food sources and to reduce bear-caused human injuries. Among the measures: garbage cans were bear-proofed and garbage dumps within the park were closed.

While bears are not commonly seen along the roadsides anymore, they may still be viewed occasionally in the wild. Grizzly bears are active primarily at dawn, dusk, and night. In spring, they may be seen around Yellowstone Lake, Fishing Bridge, and the East Entrance due to the trout spawning creeks in these areas. In mid summer, they are most commonly seen in the open meadows between Tower–Roosevelt and Canyon, and in the Lamar Valley. Black bears are most active at dawn and dusk, but may also be seen during midday. Look for black bears in open spaces within or near forested areas. Black bears

are most commonly observed on the Northern Range between Mammoth, Tower, and the Northeast Entrance.

Where can I see wildlife?

To see wildlife, it helps to know the habits of the animals you want to see and the habitats in which they live. For example, bighorn sheep eat plants and are adapted to live on steep terrain; so you could look for them on cliffs that line the Yellowstone River in the Tower area. Osprey eat fish, so you would expect to see them along rivers. Look in the park newspaper for general guidelines; ask at visitor centers for local details.

What is the difference between a bison and a buffalo?

None. In North America, both terms refer to the American bison; the scientific name is *Bison bison*. Early European explorers called this animal by many names. Historians believe that the term “buffalo” grew from the French word for beef, “boeuf.” Some people insist that the term “buffalo” is incorrect because the “true” buffalo exist on other continents and are only distant relatives. However, “buffalo” is used for less formal, everyday use; “bison” is preferred for scientific use. In this book, we use “bison.”

Why is fishing lead-free in Yellowstone?

Lead is a severe environmental contaminant and a toxic substance that has no known beneficial biological function. Scientific evidence continues to mount regarding the dangers of lead concentrations in aquatic environments. Wildlife, such as loons, waterfowl, cranes, and shorebirds, are vulnerable to lead poisoning. Of particular concern in Yellowstone are the alarmingly low populations of trumpeter swans and loons. We are trying to maintain viable breeding populations of these sensitive birds. While there is little we can do about natural hazards, we can minimize the effects of lead on these species. One way is to ban most lead tackle in the park. (Terminal tackle must be lead-free; sinkers, such as those used to fish for deep-dwelling lake trout, are permissible.)

Intro

Frequently Asked Questions

graphic removed for faster downloading

Why are geysers in Yellowstone?

Yellowstone's volcanic geology provides the three components for geysers and other hydrothermal features: heat, water, and a "plumbing" system. Within the past two million years, many volcanic eruptions have occurred in the Yellowstone area. Today, Yellowstone National Park sits on top of an active volcano. Molten rock, or magma, may be as close as 3–8 miles (5–13 km) underground. This magma provides the first ingredient: heat. Ample rain and snowfall supply the second ingredient: water. The water seeps several thousand feet (more than a kilometer) below the surface where it is heated. Underground cracks and fissures form the third ingredient: plumbing. Hot water rises through the plumbing to produce the hydrothermal features in Yellowstone. Geysers occur

when that plumbing is constricted by mineral deposition. (See Chapter 2.)

What exactly is a geyser basin?

A geyser basin is a geographically distinct area that contains a "cluster" or population of thermal features that may include geysers, hot springs, mudpots, and fumaroles. These distinct areas often (but not always) occur in topographically low areas because thermal features tend to be concentrated around margins of lava flows and in areas of faulting.

Why can't I bring my dog on geyser basin trails?

Dogs do not seem to recognize the difference between hot and cold water. Dogs have died diving into hot springs. Dogs also disturb wildlife; they are prohibited from all park trails.

Is it really dangerous to walk off the boardwalks in geyser basins?

YES! Geyser basins are constantly changing, and hollow areas may have only a thin layer of rock over them. Boiling water surges just under most geyser basins, and many people have been severely injured (second and third degree burns) when they have broken through the thin crust. Some people have died from falling into thermal features.

Why can't I smoke in the thermal areas?

Litter of any kind is a problem in these fragile areas, and cigarette butts become especially numerous if smoking is allowed. Also, sulfur deposits exist in these areas, and they easily catch fire, producing dangerous—sometimes lethal—fumes.

What is the "caldera" line on the park map (see at left)?

The caldera line marks the rim of a crater, or caldera, that was created by a massive volcanic eruption in Yellowstone approximately 630,000 years ago. The crater was filled in by lava flows after the eruption, but its rim can still be seen from several areas in the park, including Mt. Washburn, Gibbon Falls, Lewis Falls, and the Flat Mountain Arm of Yellowstone Lake.

What is the Continental Divide?

Think of the Continental Divide as the crest of the continent. Theoretically, when precipitation falls on the west side of the Divide, it eventually reaches the Pacific Ocean. When it falls on the east side of the Divide, it eventually reaches the Atlantic Ocean. In Yellowstone (as elsewhere), this ridgeline is not straight (see at left). It follows the twists and turns of the mountains through the southwestern side of the park. Therefore, you cross the Continental Divide three times while traveling from the South Entrance over Craig Pass to Old Faithful.

How many rangers work in Yellowstone?

Approximately 180 rangers work in Yellowstone National Park. Seventy-five of these are permanent employees and 105 are seasonal employees. Park rangers perform duties in education, resource management, law enforcement, emergency medical services, and backcountry operations. Many other people work here too, in the fields of research, maintenance, management, administration, trail maintenance, fire management, and fee collection. In total, approximately 800 people are employed by the National Park Service in Yellowstone (380 permanent, 420 seasonal). The park's concessioners employ about 3,700 people who manage and staff the hotels, campgrounds, gift shops, recreational and educational activities, and service stations.

What is the highest peak in Yellowstone?

Eagle Peak in the southeastern part of the park is the highest at 11,358 feet.

How cold does it get in Yellowstone in the winter?

The record low temperature was -66°F (-54°C), measured at the Riverside Station near the West Entrance of the park, on February 9, 1933. This was also the national record for low temperatures until it was broken by a temperature of -80°F (-62°C) on January 23, 1971, at Prospect Creek Camp, Alaska. Average winter highs range between 20°F and 30°F, and average lows are in the single digits above 0°F.

What's the difference between a national park and a national forest?

Though visitors often perceive them as similar, there are notable differences between national parks and national forests. National parks are administered by the Department of the Interior and national forests by the Department of Agriculture. The National Park Service is mandated to preserve resources unimpaired, while the U.S. Forest Service is mandated to wisely manage resources for a variety of sustainable uses.

Is Yellowstone the largest national park in the country?

No. Wrangell–St. Elias National Park and Preserve in Alaska is the largest unit in the National Park System (13 million acres). Until recently, Yellowstone (at 2.2 million acres) was the largest national park in the lower 48 states. But, in 1994, Death Valley National Park was established when Death Valley National Monument was expanded; this park has more than 3 million acres.

Why is Yellowstone called a Biosphere Reserve and a World Heritage Site, and what does this mean?

The United Nations has designated Yellowstone National Park as both a Biosphere Reserve and a World Heritage Site because of the worldwide significance of its natural and cultural resources. These designations have nothing to do with how

graphic removed for faster downloading

Slightly more than three million visitors come to Yellowstone each year; more than 140,000 of these visitors come in winter. These numbers are approximate and based on entries through the entrance stations, including repeats, single-occupant vehicles, and cars full of passengers. A formula is used to arrive at the visitation statistic.

Yellowstone is managed—the United Nations does not have any authority to dictate federal land-management decisions in the United States—nor do they change the fact that Yellowstone is under the legal authority of the United States of America.

The October 26, 1976, United Nations designation of Yellowstone as a Biosphere Reserve stated: “Yellowstone National Park is recognized as part of the international network of biosphere reserves. This network of protected samples of the world’s major ecosystem types is devoted to conservation of nature and scientific research in the service of man. It provides a standard against which the effect of man’s impact on the environment can be measured.”

The September 8, 1978, United Nations designation of Yellowstone as a World Heritage Site, which was requested by U.S. President Richard Nixon and Congress, stated: “Through the collective recognition of the community of nations . . . Yellowstone National Park has been designated as a World Heritage Site and joins a select list of protected areas around the world whose outstanding natural and cultural resources form the common inheritance of all mankind.”

Intro

Frequently Asked Questions

How much of the park burned in 1988?

The 1988 fires affected approximately 793,880 acres or 36 percent of the park. Most of these acres sustained ground surface burns.

Could the fires have been predicted; how were weather conditions different than in previous years?

Yellowstone usually experiences afternoon showers three or four days each week during the summer, but in 1988 there was no rain for almost three months. The most severe drought in the park's history occurred that summer. Also, a large number of lightning strikes came with a series of dry storm fronts. This lightning started many of the fires and storm fronts stoked them with particularly high and sustained winds.

Could the fires have been put out?

It is possible that the few fires that started in early June might have been extinguished. However, between 1972 and 1987, the average fire had gone out naturally after burning only one acre. So, while the early fires were monitored closely and some were contained from going out of the park, the history of fire in the park coupled with the abnormally wet spring suggested that the fires would go out as previous fires had. After July 15, all fires were fought aggressively from the moment they were detected. Despite the largest firefighting effort in the history of the nation, weather finally contained the fires when snow fell in September.

Was Yellowstone's fire policy changed after the fires of 1988?

Yes. After the fires of 1988, the fire policy underwent extensive review and a new Fire Management Plan was implemented in 1992. As before, fires that threaten life and property and fires that are human-caused will be suppressed immediately. Plus, even naturally ignited (lightning-caused) fires may be put out. The National Fire Plan 2000 was implemented late in 2000 in response to the extensive fire season that summer. (See Chapter 4.)

How does fire benefit Yellowstone?

Fires are a natural part of the Northern Rockies ecosystem. The vegetation in the Greater Yellowstone Ecosystem has adapted to fire and in some cases may be dependent on it. Fire promotes diversity by removing the forest overstory, allowing different plant communities to become established. Fire can prevent the invasion of trees into grassland areas by killing small trees before they have a chance to become islands. Fire increases the rate that minerals become available to plants by rapidly releasing these nutrients from wood and forest litter and by hastening the weathering of soil minerals. This is especially important in a dry climate like Yellowstone's, where decomposition rates are slower than in more humid areas.

In addition, the fires of 1988 provided a rare laboratory for scientists to study the effects of fire on an ecosystem.

See Chapter 4 for more information about fire ecology, management, and the fires of 1988.